General Specifications

Item	Specification
Base ignition timing	TBD
Firing order	1-4-2-5-3-6
Spark plug gap mm (in)	1.32-1.42 (0.052-0.056)
Spark plug type production LH	AWSF-42E
Spark plug type production RH	AWSF-42EG
Spark plug type service	AWSF-42EE
Silicone Brake Caliper Grease and Dielectric Compound D7AZ-19A331-A	ESE-M1C171-A

Torque Specifications

Description	Nm	lb-ft	lb-in
Spark plugs	15	11	—
Ignition coil bolts	7	—	52

Engine Ignition

The ignition coil (12029), which is mounted on the upper intake manifold, can be described as a coil pack containing three separate coil units. Each coil unit is individually controlled by the powertrain control module (PCM) (12A650) through separate wire leads. Each coil unit activates two spark plugs wired in a series by the spark plug wires (12286).

- One spark plug activates on the compression stroke and uses the majority of the ignition coil's stored energy.
- The other spark plug activates on the exhaust stroke and uses very little of the ignition coil's stored energy.
- Because the pairs of spark plugs are connected in a series, one spark will travel from ground to the electrode while the other spark will travel from the electrode to ground.

The spark plug (12405):

- changes the high voltage pulse into a spark which ignites the fuel and air mixture.
- originally equipped on the vehicle has a platinum-enhanced active electrode for long life.

The crankshaft position (CKP) sensor (6C315):

NOTE: Initial engine ignition timing is set at 10 degrees ± 2 degrees before top dead center (BTDC) and is not adjustable.

- is a variable reluctance sensor triggered by a 36-minus-1 tooth trigger pulse wheel located on the crankshaft (6303) inside the engine front cover (6019).

The sine wave type signal generated from the crankshaft position sensor provides two types of information:

- position of the crankshaft in 10 degree increments
- the crankshaft speed (rpm)

The powertrain control module (PCM) (12A650) uses this information to determine ignition coil turn ON and turn OFF times and misfire detection.

For additional information, refer to Section 303-14 .

Engine Ignition

Refer to the Powertrain Control/Emissions Diagnosis (PC/ED) manual.

Ignition Coil

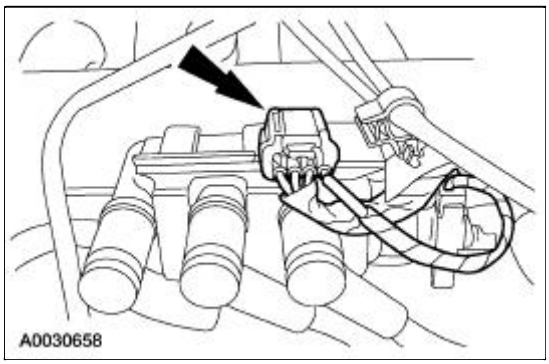
Material

Item	Specification
Silicone Brake Caliper Grease and Dielectric Compound D7AZ-19A331-A or equivalent	ESE-M1C171-A

Removal and Installation

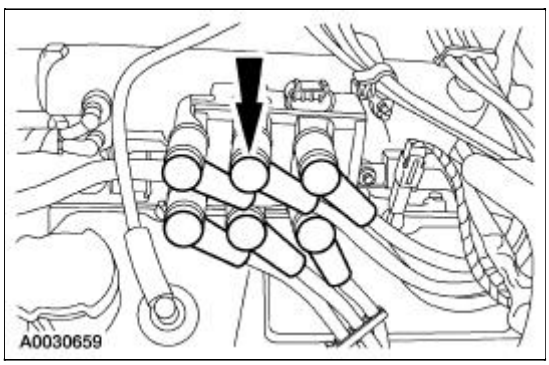
1. Disconnect the battery ground cable (14301). For additional information, refer to Section 414-01 .

2. Disconnect the ignition coil electrical connector.

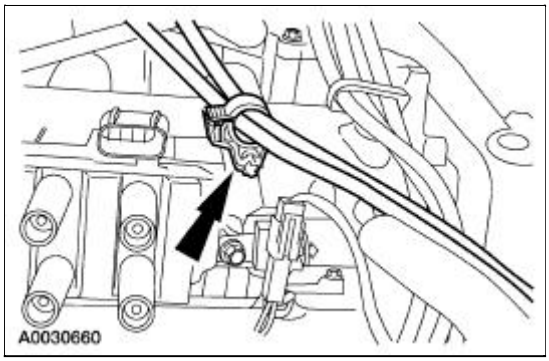


3. **CAUTION: Spark plug wires (12286) must be connected to the correct ignition coil terminal. Mark spark plug wire locations before removing them.**

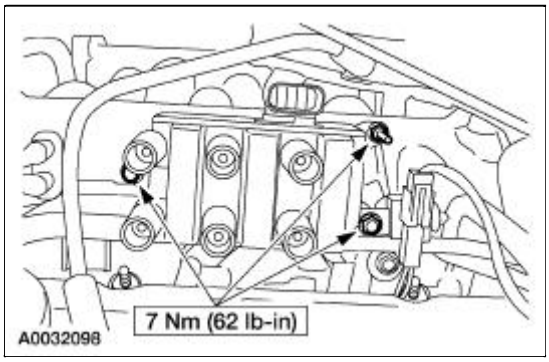
   Twist while pulling upward to disconnect the spark plug wires.



4. Disconnect the accelerator cable retaining clamp from the ignition coil stud bolt.



5. Remove the bolts and the ignition coil (12029).



6. **NOTE:** Apply silicone brake caliper grease and dielectric compound to the inside of the spark plug wire coil boot.

   NOTE: Be sure to reinstall the radio ignition interference capacitor (18801) under the correct mounting bolt.

   To install, reverse the removal procedure.

Spark Plug Wire

Special Tool(s)

ST1394-A	Remover, Spark Plug Wire 303-106 (T74P-6666A)

Material

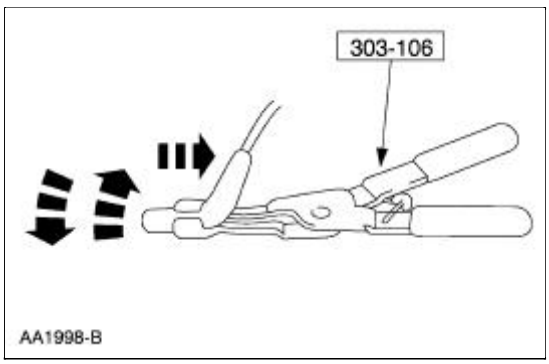
Item	Specification
Silicone Brake Caliper Grease and Dielectric Compound D7AZ-19A331-A or equivalent	ESE-M1C171-A

Removal and Installation

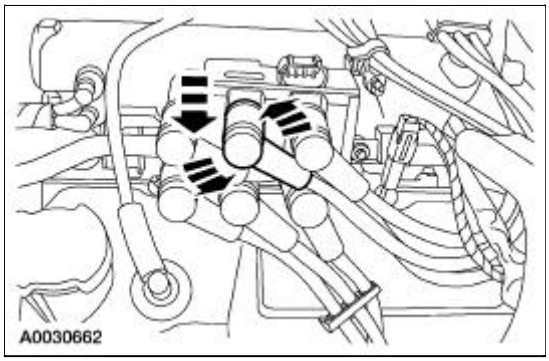
CAUTION: It is important to twist the spark plug wire boots while pulling upward to avoid possible damage to the spark plug wire.

CAUTION: Spark plug wires must be connected to the correct ignition coil terminal. Mark spark plug wire (12286) locations before removing them.

1. Using the special tool, remove the spark plug wire from the spark plug using a twisting motion.



2. Twist while pulling upward to disconnect the spark plug wires from the ignition coil (12029).



3. **CAUTION: Be sure to orient the spark plug boots so the spark plug wires do not contact the exhaust manifold.**

   NOTE: Apply silicone brake caliper grease and dielectric compound to the inside of spark plug and ignition coil boots of the spark plug wire.

   To install, reverse the removal procedure.

Spark Plugs

Special Tool(s)

ST1394-A	Remover, Spark Plug Wire 303-106 (T74P-6666A)

Material

Item	Specification
Silicone Brake Caliper Grease and Dielectric Compound D7AZ-19A331-A or equivalent	ESE-M1C171-A

Removal and Installation

CAUTION: It is important to twist the spark plug wire boots while pulling upward to avoid possible damage to the spark plug wire.

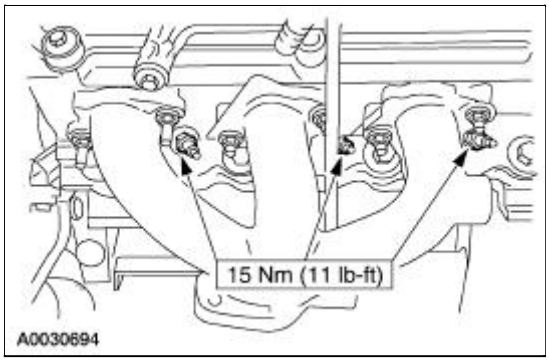
CAUTION: Spark plug wires must be connected to the correct ignition coil terminal. Mark spark plug wire (12286) locations before removing them.

1. Remove the air cleaner outlet pipe. For additional information, refer to Section 303-12 .
2. Using the special tool, remove the spark plug wires from the spark plugs using a twisting motion.
3. **NOTE:** Use compressed air to remove any foreign material from the spark plug well before removing the spark plugs.

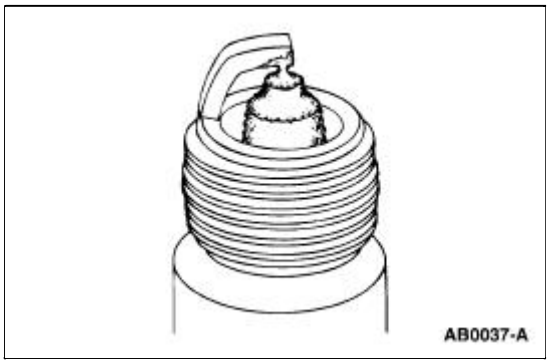
   NOTE: If an original spark plug is reused, make sure it is installed in the same cylinder from which it was taken. New spark plugs can be used in any cylinder.

   NOTE: Left side shown, right side similar.

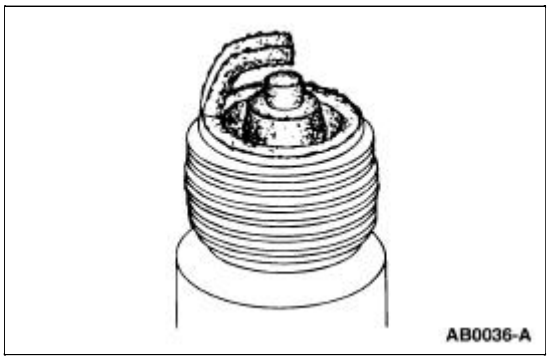
   Remove the spark plugs.



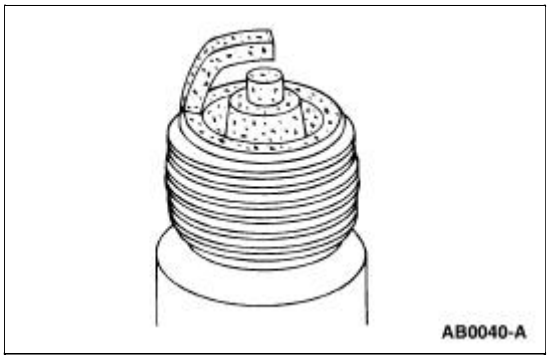
4. Inspect for gap bridged.
    - This can be identified by deposit build up closing the gap between electrodes.
    - This may be caused by oil or carbon fouling.
    - Clean the spark plug.



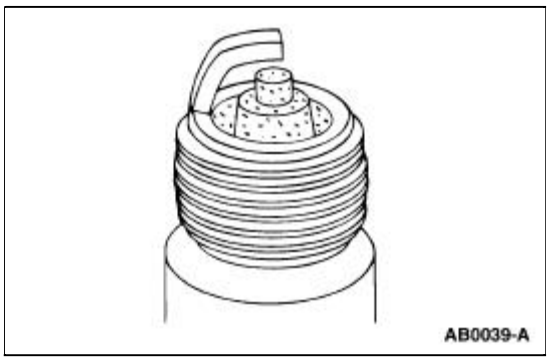
5. Inspect for oil fouling.
    - This can be identified by wet black deposits on the insulator shell bore electrodes.
    - This may be caused by excessive oil entering the combustion chamber through worn rings and pistons, excessive clearance between valve guides and stems, or worn or loose bearings. Correct the oil problem.
    - Install a new spark plug.



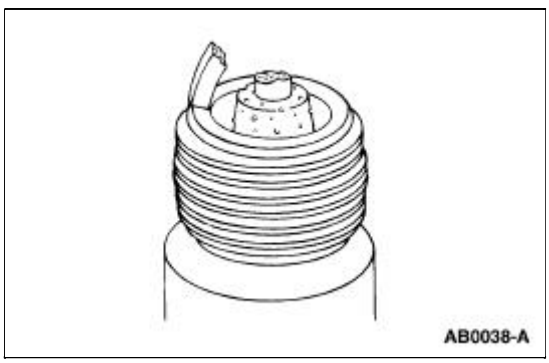
6. Inspect for carbon fouling.
    - This can be identified by black, dry, fluffy carbon deposits on the insulator tips, exposed shell surfaces and electrodes.
    - This may be caused by too cold a plug, dirty air cleaner, damaged fuel pump, too rich a fuel mixture or excessive idling.
    - Clean the spark plug.



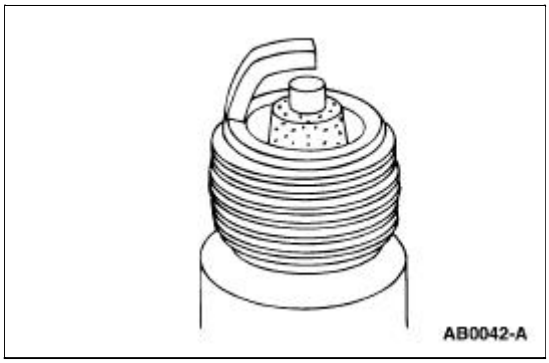
7. Inspect for normal burning.
    - This can be identified by light tan or gray deposits on the firing tip.



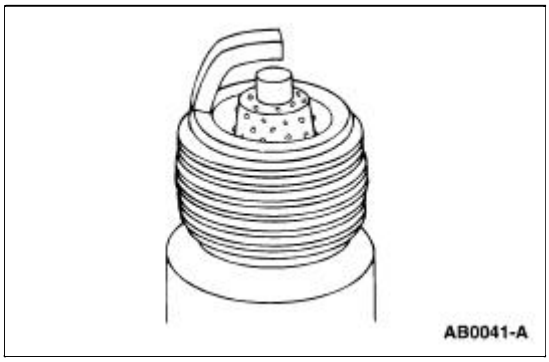
8. Inspect for pre-ignition.
    - This can be identified by melted electrodes and possibly a blistered insulator. Metallic deposits on the insulator indicate engine damage.
    - Install a new spark plug.



9. Inspect for overheating.
    - This can be identified by a white or light gray insulator with small black or gray brown spots and a bluish-burnt appearance of the electrodes.
    - This may be caused by engine overheating, the wrong type of fuel, loose spark plugs, too hot a plug, low fuel pump pressure or incorrect ignition timing.
    - Install a new spark plug.



10. Inspect for fused spot deposits.
    - This can be identified by melted or spotty deposits resembling bubbles or blisters.
    - This can be caused by sudden acceleration.
    - Clean the spark plug.



11. **CAUTION: Be sure to orient the spark plug boots so the spark plug wires do not contact the exhaust manifold.**

    NOTE: Apply silicone brake caliper grease and dielectric compound to the inside of the spark plug wire boots.

    To install, reverse the removal procedure.
    - Adjust the spark plug gap as necessary.